

THE ANNALS  
AND  
MAGAZINE OF NATURAL HISTORY,

No. 99. MAY 1845.

---

XLI.—*Description of a new genus of Calcareous Sponge.* By  
J. S. BOWERBANK, F.R.S., L.S. &c.

[With a Plate.]

DUNSTERVILLIA.

*Gen. Char.*—Sponge calcareous, outer surface arranged in polygonal plates or compartments. Body composed of simple, straight, angulated canals radiating from the central axis of the sponge.

*D. elegans.*—Sponge sessile, sacculate, compressed; ventral orifice single, terminal, surrounded by a single or double fringe of erect, simple, asbestiform spicula. External oscula indistinct. Spicula of the body simple-double-pointed and tri-radiate.

This interesting little sponge was attached to the stem of a new species of *Corallina*, which I received among a valuable collection of Sponges, Zoophytes and Fuci from my kind and liberal friend Mr. George Dunsterville, surgeon of Port Elizabeth, Algoa Bay, after whom I have named it in acknowledgement of the repeated contributions which he has made to our knowledge of the marine natural history of that part of the world. It was found on the beach at Cape Recife, about ten miles from the town.

This singular sponge would naturally fall under Dr. Fleming's *Grantia*, if we were to confine ourselves to the brief description which he has given of that genus; and even under the enlarged generic character given by Dr. Johnston in his 'History of the British Sponges,' there is but a very slight distinction between them. But however well the material may accord with that of *Grantia*, the structural peculiarities are so strikingly distinct from any species of that genus with which I am acquainted, that I have ventured to make it the type of a new family; and I have been the more inclined to do so, as, although I know of no recent analogue, yet there is one in the fossil state which is found in

one of our oldest geological strata, to which I believe I shall hereafter prove it to be very closely allied.

I possess but two specimens of the recent species; one of them is attached by a broad base to the stem of a *Corallina*, the other was found detached, but appears to have been based in a similar manner; so far therefore as I can judge from this limited number, the sponge is a sessile species. Plate XVII. figs. 1 and 2. represent them of the natural size.

Both of them present the same compressed character, the elongated one to a greater extent of the two; and this compression, it is evident from the mode of disposition and the proportions of the radiating canals, is natural, and not the effect of collapse from drying.

The ventral orifice in the larger specimen is nearly closed, and in the smaller one entirely so, by a thick fringe of long, attenuated, asbestiform spicula, which converge towards a point opposite the centre of the orifice; surrounding the base of this terminal fringe there is a second thin fringe of similar spicula based upon a ring slightly raised from the surface of the sponge. The latter radiate at nearly right angles from the surface of the animal; but as these appendages have evidently suffered much from mutilation, it may be that the second one is but the outer portion of one mass of spicula surrounding the great excurrent orifice.

The external surface of the sponge is composed of polygonal plates or compartments, usually four-, five- or six-sided, as represented by Plate XVII. fig. 3. with a power of forty-five linear, and also by fig. 4. with a linear power of ninety-four. In many parts of the surface they present the appearance of a quincuncial arrangement.

Upon examining a section of one of these plates or compartments made at right angles to the natural surfaces, the outer portion was found to be composed of a layer of minute, simple-double-pointed spicula, with their axes at right angles to the outer surface of the plate; and immediately beneath these there is a mass of large triradiate spicula, many of which have one ray much exceeding in length either of the other two; and this occurs more especially when they are in the neighbourhood of the under surface of the layer of simple spicula, and in these cases the long ray is usually imbedded amid the simple spicula of the outer layer. Plate XVII. fig. 7. represents a portion of a section of one of the plates, viewed by transmitted light, with a power of 150 linear.

Beneath each of these plates or compartments there is a single large angulated canal, usually four-sided, which passes in a straight line towards the central axis of the sponge. The parietes of these canals are composed of interlacing triradiate spicula, two of the

rays of each spiculum being disposed at right angles to the long axis of the canal, while the third projects into it in a diagonal direction towards the outer surface of the sponge. This arrangement presents one of the most delicate and beautiful interlacings of spicula that I have ever observed. Plate XVII. fig. 6. represents a view of four of the cells by the aid of a Lieberkuhn and a power of 100 linear.

The large angulated canals terminate on the inner surface of the sponge with open mouths, which are nearly circular and somewhat less in diameter than the cells, the diminution of the apertures being produced by a greater accumulation and a closer disposition of the triradiate spicula. Plate XVII. fig. 5. represents a view of a portion of the inner surface of the longer of the two specimens by the aid of a Lieberkuhn and a power of 100 linear, and figs. 8, 9, and 10. represent simple and triradiate spicula of the outer surface of the sponge by transmitted light and a power of 150 linear.

I could not detect the passages by which the incurrent streams of water pass. In most of the plates or compartments near the base of the outer surface of the smaller sponge there was a central depression, but I could find no perforations. The greater number of the plates in the larger specimen were convex to a considerable extent.

When a piece of the sponge was placed in dilute hydrochloric acid it effervesced and the spicula dissolved rapidly, leaving a small mass of animal matter, from which numerous portions of minute vessels projected.

Professor Phillips in his 'Figures and Descriptions of the Palæozoic Fossils of Cornwall, Devon and West Somerset,' describes and figures from Sir H. de la Beche's paper in the 'Transactions of the Geological Society,' vol. iii. pl. 20, a fossil, *Sphæronites tessellatus*, the outer surface of which has a tessellated structure very similar in appearance to *Dunstervillia elegans*. The Professor and other authors have evidently felt much doubt as to the nature of this apparently anomalous fossil, and under this feeling he concludes his observations by saying, "Meantime I wish to include it in the group to which it bears the most obvious external resemblance, and therefore propose to name it for provisional reference *Sphæronites tessellatus*."

The great similarity which exists between this fossil and *Dunstervillia* struck me forcibly immediately I saw the latter. The external appearance of the plates or compartments in the fossil is precisely that of the recent sponge, and like it, they vary in having from four to six angles. In one specimen, which exhibits a very complete view of the interior of the fossil, and for the loan of which I am indebted to my friend Dr. Battersby of Torquay,

the analogy is still further completed, and the distinction between it and any known crinoidal or echinodermal form is strongly portrayed. If it were a member of either of these two families, it would exhibit on their internal surfaces the same form and number of angles as they do at the external ones; but this is not the case with the fossil, the inner surface of which presents no appearance whatever of tessellated structure; but in place of it there is a series of raised lines or ridges running longitudinally, and corresponding in their width and direction with the lines of angular compartments on the exterior. The spaces formed by these parallel lines are again divided, most frequently at right angles, by a number of short raised lines, so that the interior surface is covered with numerous, oblong, square, or occasionally triangular sunken areas, presenting exactly the appearance that we should have, supposing that the series of fragile cells, equivalent to those in the recent *Dunstervillia*, to be broken away down to their bases, on the inner surface of the outer coat of the sponge.

The microscopical examination of both the outer and inner surfaces of the fossil also strongly favours the idea of its spongy origin. While the surrounding matrix is solid and crystalline, the fossil is exceedingly porous. From the regularity of its structure and the character of its interspaces, it presents strong traces of the original organic arrangement of its parts, and like its recent type, the outer surface of the plates is very much more close and even in texture than they are immediately beneath; and these appearances are not peculiar to the specimen belonging to my friend Dr. Battersby, but they exist also in an equal degree in a second specimen presented to me by that gentleman.

#### EXPLANATION OF PLATE XVII.

##### DUNSTERVILLIA ELEGANS.

*Figs. 1 & 2.* The sponges of their natural size.

*Fig. 3.* The specimen represented by fig. 1. viewed by direct light with a power of 45 linear.

*Fig. 4.* A few of the quadrangular and pentangular plates of the same specimen as seen with a power of 94 linear.

*Fig. 5.* A view of the terminations of some of the large angulated canals at the inner surface of the sponge with a power of 100 linear.

*Fig. 6.* A portion of a section of the sponge at right angles to the natural surfaces, exhibiting the form and disposition of the angulated canals, seen with a Lieberkuhn and a power of 100 linear.

*Fig. 7.* A portion of a section of one of the plates seen by transmitted light with a power of 150 linear.

*Figs. 8 & 9.* Triradiate spicula magnified 150 linear.

*Fig. 10.* One of the simple-double-pointed spicula magnified 150 linear.